START

0015130

June 19, 1991

Meeting Minutes Transmittal/Approval
Unit Managers Meeting: 100-FR-1 Operable Unit
450 Hills St., Room 47
Richland, Washington
April 16, 1991

From/
Appvl.: *James Goodenough* Date: *June 19, 1991*
James D. Goodenough, R.I. Coordinator, DOE-RL (A6-95)

Appvl.: *Pamela J. Innis* Date: *June 19, 1991*
Pamela Innis, Unit Manager, EPA (B5-01)

Appvl.: *L. Goldstein* Date *JUNE 19, 1991*
Larry Goldstein, CERCLA Unit Supervisor, Washington Dept. of Ecology

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The purpose of this meeting was to discuss the status of the 100-FR-1 operable unit.

Meeting Minutes are attached. Minutes are comprised of the following:

- Attachment #1 - Meeting Summary/Summary of Commitments and Agreements
- Attachment #2 - Attendance List
- Attachment #3 - Presentation - 100-FR-1 Operable Unit Work Plan Status

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Prepared by: *Doug Fassett* Date: *2/10/91*
SWEC GSSC

Concurrence by: *John T. Stewart* Date: *6/19/91*
USACE Unit Manager

Distribution

100-FR-1 Unit Managers Meeting
April 16, 1991

Dave Einan, EPA (B5-01)
Pamela Innis, EPA (B5-01)
Doug Sherwood, EPA (B5-01)
Dan Duncan, EPA, Region 10, RCRA
Chuck Cline, WDOE (two copies)
R.O. Patt, Oregon Water Resources Dept.
Ward Staubitz, USGS
Donna Lacombe, PRC
Doug Fassett, SWEC (A4-35)
Jim Goodenough, DOE-RL (A6-95)
Mary Harmon, DOE-HQ (EM-442)
Bob Stewart, DOE-RL (A6-95)
John Stewart, USACE
Jim Patterson, WHC (B2-15)
Tim Veneziano, WHC (B2-35)

ADMINISTRATIVE RECORDS: 100-FR-1, Care of Susan Wray, WHC (H4-22)

Please inform Doug Fassett (SWEC) of deletions or additions to the distribution list.

Attachment #1

Summary of Meeting and Commitments and Agreements
100-FR-1 Unit Managers Meeting
April 16,1991

1. John Stewart (USACE) announced that the 100-FR-1 Operable Unit Remedial Investigation/Feasibility Study Work Plan was turned in to DOE on April 15. Bob Stewart (DOE-RL) indicated that a copy of the work plan had been express mailed to DOE-HQ that morning (April 16), and that it is expected to be released to the regulators by April 30, per the Tri Party Agreement milestone. John Stewart introduced Tom Johnson and Dave Graham of Tetra Tech. They gave a presentation on the work plan and conceptual model of the site, which they prepared.

2. Tom Johnson distributed a handout on the work plan (see Attachment #3). The 100-FR area has been divided into 2 operable units: FR-1 is the source unit and deals with liquid waste while FR-2 deals with solid waste disposal. A difference between the 100-FR area and other 100 areas is the animal laboratory facilities and associated waste. Otherwise, sources were the typical combination of trenches, cribs, etc; 26 sources have been identified. Background information is sparse. For the most part, only radionuclide contaminant data was available as a basis for the work plan.

3. Dave Graham discussed the geology and hydrogeology of the 100-FR Area. He mentioned the recent work of Kevin Lindsey in developing a new interpretation of the stratigraphy of the Hanford and Ringold Formations. The best information presently available to tie the 100-FR-1 area into this stratigraphic framework is from monitoring well 84-35A, which is northwest of the 100-FR-1 Operable Unit. The information available from onsite wells is poor; they are often screened over long intervals that span several stratigraphic intervals. Well clusters will be installed to sort out vertical gradients and sample different aquifers. Four clusters of monitoring wells, nine single monitoring wells and a total of about 120 boreholes are planned. A figure illustrating the complex flow pattern resulting from mounding beneath a retention basin was presented to suggest how contaminants may have been transported beneath the site (see Attachment #3).

4. Tom Johnson said sampling of both surface water and seeps along the Columbia River is included in the work plan. The risk assessment that is planned will include a full characterization of sources and worst case concentrations of contaminants. Sufficient data will be obtained to evaluate risks for both non-restrictive (ex., residential) and restrictive (ex., residential) scenarios. It was indicated that phasing of the RI/FS effort will be minimized by performing a thorough Remedial Investigation. There was a final discussion on the assumptions on the rate of drilling to meet the RI/FS schedule. It was suggested that the estimates were optimistic.

Attachment #2

Attendance List
100-FR-1 Unit Managers Meeting
April 16, 1991

Name	Org.	O.U.	Phone
Goodenough, Jim	DOE-RL	DOE O.U.	(509) 376-7078
Stewart, John	DOE-RL	DOE backup	(509) 376-6192
Cline, Chuck	Ecology	CERCLA Unit	(206) 438-7556
Hibbard, Richard	Ecology	CERCLA Unit	(206) 493-9367
Innis, Pam	EPA	Unit Manager	(509) 376-4919
Moore, Clyde	PMX	Ecology Support	(206) 455-2550
Shuster, Jerry	PRC	EPA Support	(206) 624-2692
Fassett, Doug	SWEC	GSSC to DOE-RL	(509) 376-3136
Fryer, Bill	SWEC	GSSC to DOE-RL	(509) 376-9830
King, Joe	SWEC	GSSC to DOE-RL	(509) 376-4726
Graham, David	Tetra Tech	100-FR-1 RI/FS	(503) 620-7237
Johnson, Tom	Tetra Tech	100-FR-1 RI/FS	(503) 620-7237
Foote, Alden	USACE	Env. Eng.	(509) 522-6870
Stewart, John	USACE	PM	(509) 376-9101
Drost, Brian	USGS	EPA Support	(206) 593-6510
Staubitz, Ward	USGS	EPA Support	(206) 593-6510
Downey, H. D.	WHC	ER Program	(509) 376-5539
Krug, Alan D.	WHC	100-FR-1 Coord.	(509) 376-5634

DOE/RL-90-33
DRAFT A

REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN For The 100-FR-1 OPERABLE UNIT HANFORD SITE

Prepared For

U.S. Department of Energy
Richland, WA

Prepared By

U.S. Army Corps of Engineers
Walla Walla District

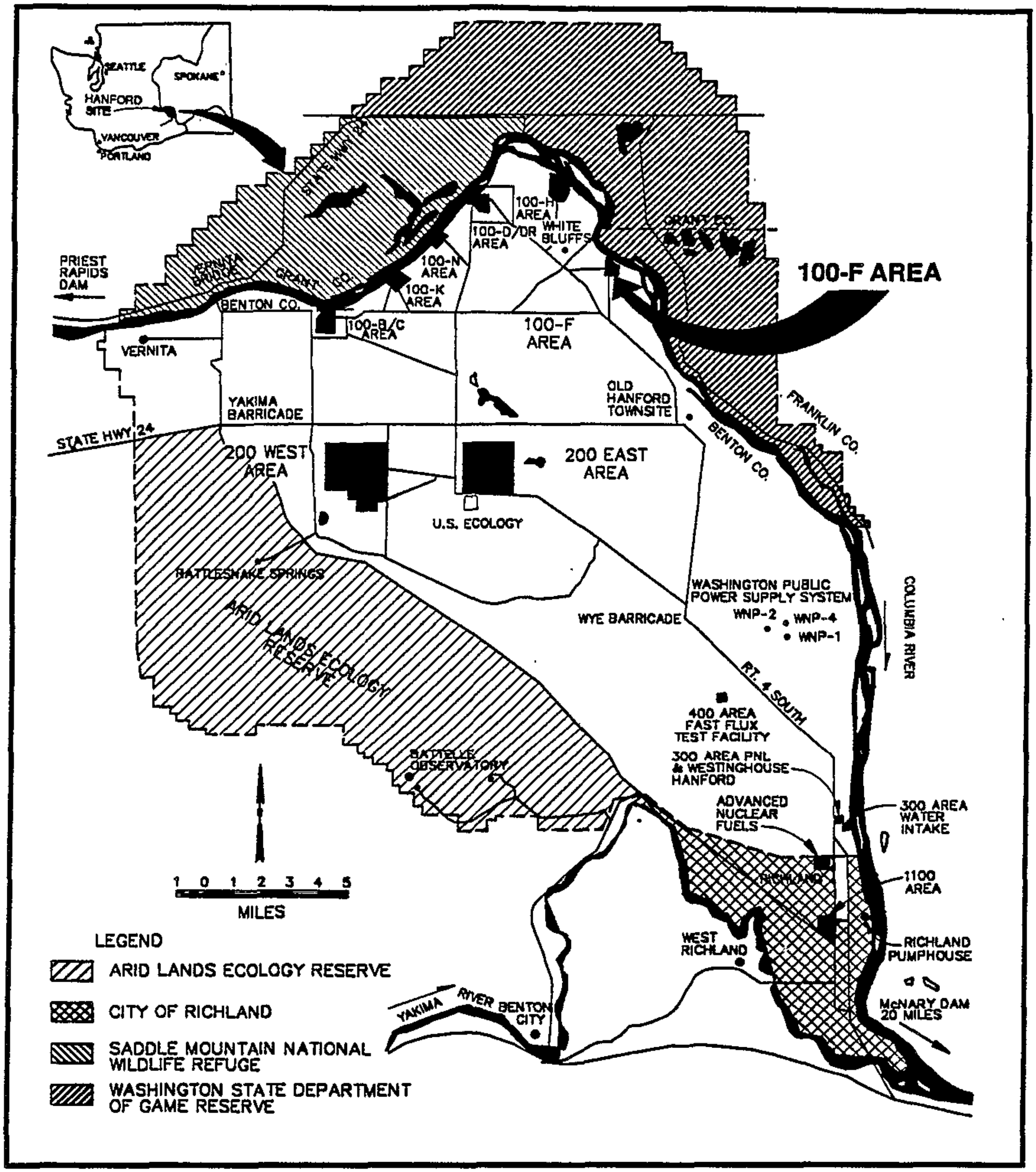


Figure 1-1. General Location of the Hanford Site and the 100-F Area near Richland, Washington.

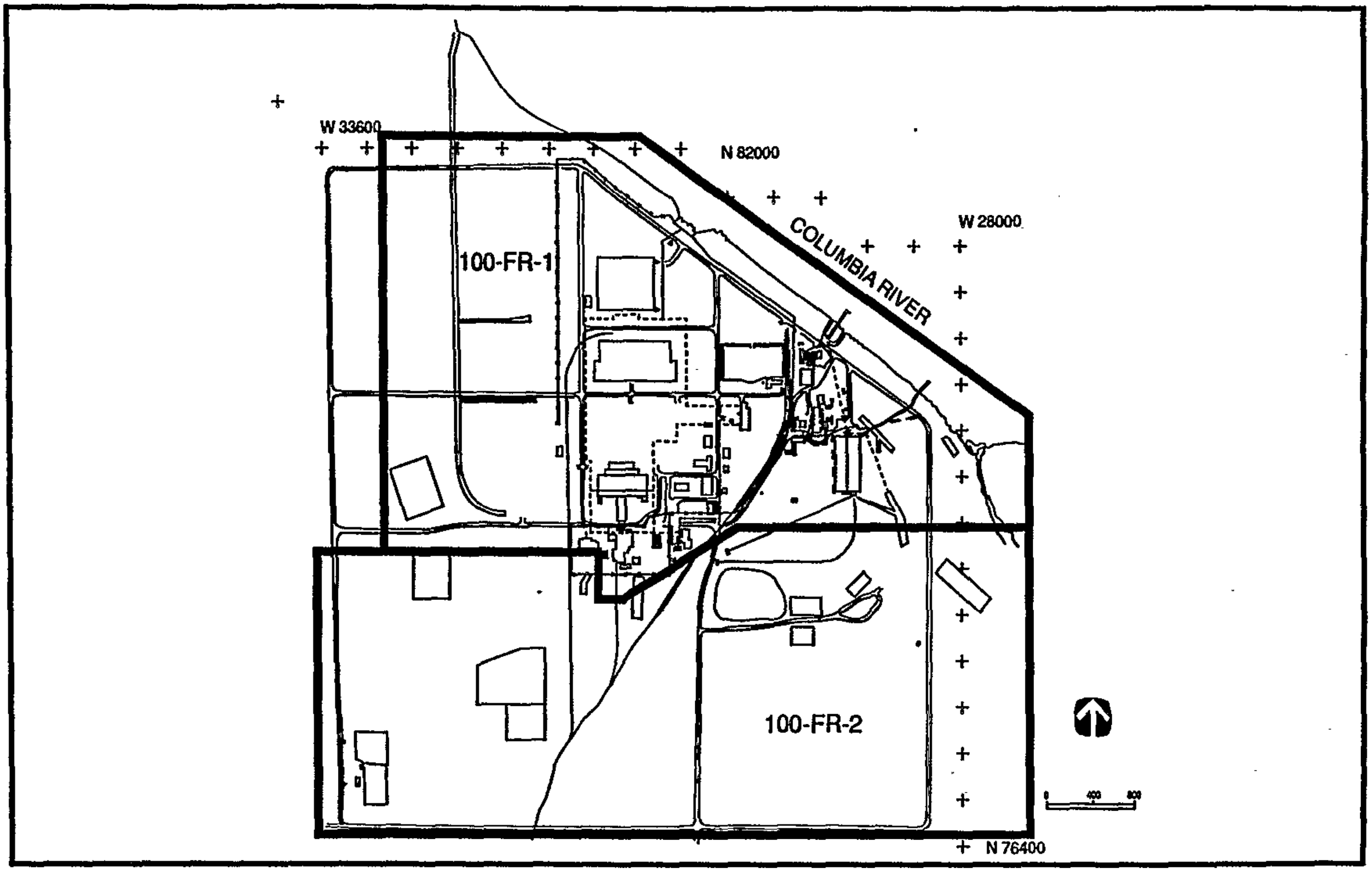


Figure 1-2. Location of the 100-FR-1 and 100-FR-2 Operable Units within the 100-F Area.

SOURCES

Designation	Site
116-F-1	Trench
116-F-2	Trench and EM Bypass Ditch
116-F-3	Trench
116-F-4	Crib
116-F-5	Crib
116-F-6	Trench
116-F-7	French Drain.
116-F-8	Outfall Structure and PNL Outfall
116-F-9	Trench
116-F-10	French Drain
116-F-11	French Drain
116-F-12	French Drain
116-F-13	French Drain
116-F-14	Retention Basin, Basin Leak Ditch, and Influent Pipelines
1607-F2	Septic Tank
1607-F3	Septic Tank
1607-F4	Septic Tank
1607-F5	Septic Tank
1607-F6	Septic Tank
UN-100-F-1	Spill
118-F-8	Reactor[a]
132-F-4	Stack
132-F-6	Pump Station
126-F-2	Demolition and Inert Waste Landfill
132-F-3	Gas Recirculating Facility
132-F-5	117-F Filter Building

[a] The reactor itself is not a part of the operable unit; however, contamination in adjacent areas resulting from the reactor will be investigated.

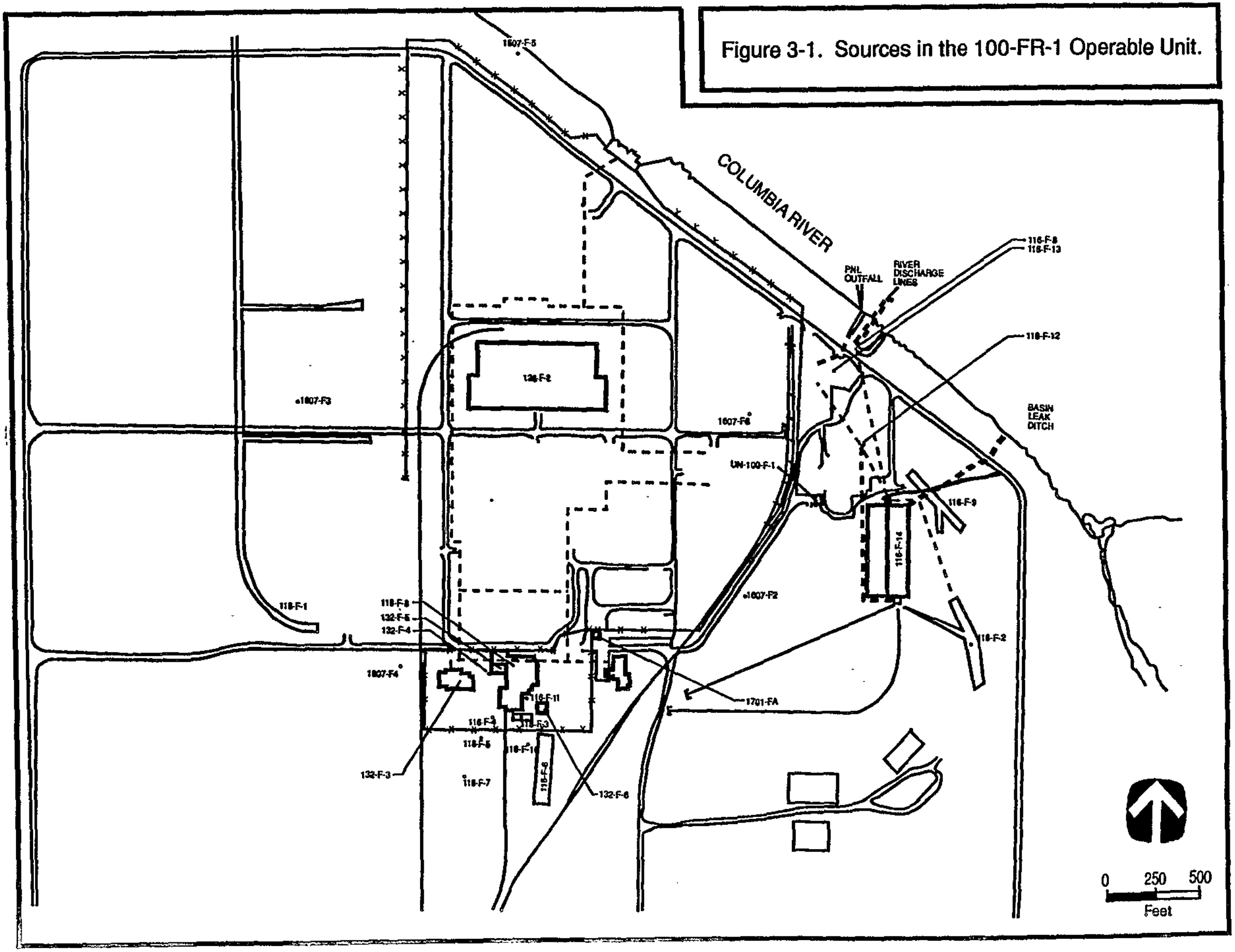


Figure 3-1. Sources in the 100-FR-1 Operable Unit.

TABLE 3-1. 100-FR-1 SOURCE AREAS (Sheet 1 of 3)							
Current Designation (Original Designation)	**Description**	**Years in Service/Status**	**Waste Received or Handled In the 100-FR-1 Operable Unit**	**Length (ft)**	**Width (ft)**	**Depth (ft)**	**Diameter (ft)**
116-F-1 (Lewis Canal)	Trench	1953-1960/ Inactive	Liquid wastes from F Reactor and 190-F buildings and decontamination wastes from 189-F building; occasionally, contaminated reactor coolant. Effluent water drained to the river via this trench during Ball 3X outage in 1953.	3,000	40	10	
116-F-2 (107-F Basin Overflow Trench)	Basin overflow trench with flume	1950-1965/ Inactive	Effluent overflow from the 116-F-14 retention basin at times of high activity due to a fuel element failure; also received overflow from F Reactor fuel storage basin during deactivation of the retention basin.	300	50	15	
116-F-3 (105-F Fuel Storage Basin Trench)	Trench	1947-1951/ Inactive	Cooling water effluent contaminated by an early fuel element rupture; in 1951, sludge from the F Reactor storage basin was placed in trench.	100	10-20	8-10	
116-F-4 (105-F Pluto Crib)	Crib	1950-1952/ Inactive	Cooling water from process tubes containing ruptured fuel elements.	10	10	10	
116-F-5 (Ball Washer Crib)	Crib	1953/Inactive	Waste from decontamination of irradiated boron-steel balls.	10	10	10	
116-F-6 (1608-F Liquid Waste Disposal Trench)	Trench	1952-1965/ Inactive	Diverted cooling water effluent during reactor maintenance outages.	300	100	10	
116-F-7 (117-F Crib)	French drain	1960-1965/ Inactive	Drainage from confinement system filter seal pits in the 117-F building.			10	4
116-F-8 (1904-F)	Outfall structure	1945-1965/ Demolished	Cooling water from retention basin, discharged via pipes or spillway to river.	27	14	26	
116-F-9 (PNL Animal Waste Leach Trench)	Trench	1963-1976/ Inactive	Contaminated wash/wastewater from animal pens, containing ^{90}Sr and ^{239}Pu.	400 100	15-40 15-40	10 10	
116-F-10 (105-F Dummy Decon. French Drain)	French drain	1948-1965/ Inactive	Spent nitric acid and rinse water from the decontamination of fuel element spacers at F Reactor.			20	3
116-F-11 (105-F Cushion Corridor French Drain)	French drain	1953-1965/ Inactive	Cushion corridor decontamination waste.			3	3

TABLE 3-1. 100-FR-1 SOURCE AREAS (Sheet 2 of 3)

Current Designation (Original Designation)	Description	Years in Service/Status	Waste Received or Handled In the 100-FR-1 Operable Unit	Length (ft)	Width (ft)	Depth (ft)	Diameter (ft)
116-F-12 (148-F French Drain)	French drain	1944-1964/ Inactive	Overflow, priming water, etc. from 148-F pump house, which in turn controls the flow of effluent water from the retention basin to the 146-F fish ponds.			6	3
116-F-13 (1705-F Experimental Garden French Drain)	French drain	1952-1976/ Inactive	Cooling water effluent used in botany experiments.			3	3
116-F-14 (107-F)	Retention basin	1945-1965/ Inactive	Used to retain cooling water effluent from F Reactor to allow radioactive and thermal cooling. Also received water from reactor building drains.	467	230	20	
108-F* French Drain	French drain	Unknown/1976 Inactive	Received condensate from heads inside the 108-F biology laboratory. Possibly contaminated with plutonium and other beta emitting isotopes.				
1607-F2	Septic tank and drain field	1944-Present (Active)	Sanitary sewage from 184-F, 185-F, 190-F, F Reactor, and 108-F buildings.				
1607-F3	Septic tank and drain field	1944-1965	Sanitary sewage from 182-F, 183-F, and 151-F.				
1607-F4	Septic tank and drain field	1944-1965	Sanitary sewage from 115-F building.				
1607-F5	Septic tank and drain field	1944-1965	Sanitary sewage from 181-F pump house.				
1607-F6	Septic tank and drain field	1945-1975	Sanitary sewage from 141-B, -C, -F, and -M buildings and 146-FR.				
UN-100-F-1	Spill	March 13, 1971	Main sewage line from 141-C to 141-M became plugged and spread contamination containing small quantities of ^{90}Sr and ^{239}Pu on ground.	40	40		
118-F-8 (105-F)	Reactor building/irradiated fuel storage basin	1945-1965	Reactor operations; fuel storage basin leaked for several years prior to deactivation.				
126-F-2* (183-F Clearwells)	Concrete clearwells	1945-1965/ Demolished	Received clarified water from the 183-F filter plant. Incoming water contained low levels of contamination from reactors upstream.				
132-F-1* (141-F)	Chronic feeding barn	1950-1980/ Demolished	Housed animals used in dose studies with ^{90}Sr, ^{137}Cs, ^{131}I, and ^{239}Pu				

TABLE 3-1. 100-FR-1 SOURCE AREAS (Sheet 3 of 3)							
Current Designation (Original Designation)	Description	Years in Service/Status	Waste Received or Handled In the 100-FR-1 Operable Unit	Length (ft)	Width (ft)	Depth (ft)	Diameter (ft)
132-F-2* (144-F)	Particle exposure lab	Unknown-1980/ Demolished	Laboratory facilities for dose studies on dogs using ^{239}Pu.				
132-F-3* (115-F)	Gas recirculation facility	1945-1965/ Demolished	Housed gas reciruclation blowers, drying towers, condensers, coolers, and filters.				
132-F-4 (116-F)	F Reactor exhaust stack	1945-1965/ Demolished	Discharged ventilation air from the F-Reactor.				
132-F-5*	Exhaust air filter building	1960-1965/ Demolished	Contained filters for exhaust air from F-Reactor confinement zones.				
132-F-6 (1608-F Lift Station)	Demolition site	1945-1965/ Demolished	Pumped miscellaneous effluent from F Reactor drain systems to the 116-F-14 retention basin.	38	35		
182-F*	Reservoir	1945-1965/ Demolished	Held raw water pumped from river for use in reactor cooling system. Water contained low levels of contamination from reactors upstream.				
183-F*	Treatment plant	1945-1965/ Demolished	Housed treatment and filtering facilities for water destined for F Reactor cooling water system. Incoming water contained low levels of contamination from reactors upstream.				
PNL Outfall	Outfall structure	Unknown-1963/ Demolished	Used as an outfall for contaminated washwater from animal pens.				

*These structures/waste units were not listed in the Hanford Federal Facility Agreement and Consent Order (Ecology et al. 1989)
(Sources: ERDA-1538, DOE/RL88-30, RL-REA-2514, Stenner et al. 1988, HW-46715, HW-27337, HW-43121)

SITE CONCEPTUAL MODEL

- Contaminant sources. Most of the data for source location is for the upper 20 ft (6 m) of the vadose zone. The base of some source units may have intercepted the top of the groundwater table during reactor operations. Inference is made to the presence of contaminants near the unconfined water table based on groundwater contamination, historic records of water levels, type of waste disposed (liquid), and groundwater temperature data.

- The hydrogeologic system. This is based on the integration of hydrodynamic, hydrogeologic, and geologic data. The data are sparse and unevenly distributed on the 100-F Area; however, data from the Hanford Site in general and the 100-H Area are available, and inferences are made from these data.

- Barriers to contaminant transport. This is based on the integration of contaminant, hydrodynamic, hydrogeologic, and geologic data. Again, the data are sparse and unevenly distributed on the 100-F Area; however, data from the Hanford Site in general and the 100-H Area are available, from which inferences are made.

- Contaminant pathways to potential receptors. This is based on the integration of contaminant, hydrodynamic, hydrogeologic, and geologic data. Inferences are made on relatively sparse and unevenly distributed data.

- The spatial distribution of contaminants in the groundwater system. Available data are limited to the unconfined aquifer. There are no onsite data regarding vertical hydraulic gradients.

- The interaction of groundwater with surface water and sediment. Investigations downstream of the 100 Areas indicate that contaminants that reach the Columbia River are diluted to below ARARs or detection limits, although localized significant concentrations could exist.

- Effects on biota. Much work has been done on the Hanford Site in general, but little has been done at the 100-F Area.

PRIMARY SOURCES

- The 116-F-14 cooling water retention basin, associated pipelines, and the 116-F-2 basin overflow trench in the eastern and northeastern portion of the 100-FR-1 Operable Unit.

- The 116-F-4 pluto crib, which received cooling water from process tubes containing ruptured fuel elements.

- The 118-F-8 irradiated fuel storage basin.

- The 116-F-6 liquid waste disposal trench, south of the F Reactor.

- The 116-F-5 ball washing crib, where nitric acid was disposed in quantities, the 116-F-10 French drain which received spent nitric acid and rinse water from decontamination of dummy fuel elements, and the liquid waste disposal cribs near the F Reactor.

- The 116-F-9 animal waste leach trench, which received liquid waste generated from washing down the animal pens.

- The 126-F-1 Ash Disposal pit. The disposal of the ash as a water slurry into the 10 to 15 ft (3 to 4.6 m) deep pit may have contributed to a groundwater mound during operations. The ash would be expected to contain significant concentrations of heavy metals and may have been acidic. .

VADOSE ZONE

- The lithology of the vadose zone is variable, but generally consists of sandy, cobbley, very coarse gravel overlying interbedded sandy gravels and sands, and is very permeable. Toward the river, the interbedding of sands and gravels may control vertical and horizontal migration of contaminants.

- The vadose zone has been contaminated with various radionuclides, nitrates, chromium, and possibly other chemicals by the intentional and unintentional disposal of liquid and solid wastes within the 100-FR-1 and 100-FR-2 Operable Units.

- There are a large number of documented waste handling and disposal facilities (sources) at or near ground surface where liquid wastes were deliberately or accidentally discharged to the soil column. These shallow surface sources have resulted in the presence of localized, concentrated contamination within the shallow vadose zone soils (0 to 20 feet) (0 to 6 m).

- Contaminants are present throughout the vadose zone below the major source units.

- Contaminants in the capillary fringe of the vadose zone can be released to the groundwater through surface infiltration and/or water table fluctuations.

- Distribution of contaminants at the capillary fringe is widespread as a result of the presence of a groundwater mound which was centered under the 116-F-14 basin and extended beneath the reactor building area during operations.

- The groundwater mound intercepted the base of the deeper waste units close to the 116-F-14 basin.

GROUNDWATER SYSTEM

- The upper portion of the unconfined aquifer has been contaminated with various radionuclides, nitrates, and chromium by operations at the 100-F Area.
- The unconfined aquifer includes heterogeneous deposits of the Hanford and Ringold formations.
- The sediments of the Ringold Formation are heterogeneous, resulting in anisotropic groundwater flow and contaminant transport.
- The shallow aquifer is hydraulically connected with the Columbia River. Changes in stage in the river, due to variations in discharge from the Priest Rapids Dam, directly affect the direction and rate of groundwater flow beneath the 100-F Area.
- A hot groundwater mound extending upward to approximately 385 ft (117 m) MSL was present beneath the 100-F Area during operations. This mound influenced water levels and tritium and nitrate concentrations in offsite wells up to 1 mile (1.6 km) away.
- Contaminants that were displaced upgradient by the groundwater mound are now moving towards the river with the re-established natural groundwater gradient.

SURFACE WATER AND SEDIMENTS

- Groundwater from the unconfined aquifer discharges to the Columbia River through springs near river level and as baseflow through the river bed.
- Contaminants are expected in association with nearshore sediments where groundwater from the 100-F Area is discharging to the Columbia River.
- Aquatic plants uptake of contaminants from the sediments and associated groundwater.
- People using the nearshore areas for recreational activities may also be directly exposed to contaminated sediments.

AQUATIC BIOTA

- Little site-specific data on biota in the 100-F Area; studies at other sites in the 100 Areas and the ongoing Hanford Environmental Monitoring Program provide sufficient information for a general understanding of the biota at the 100-FR-1 Operable Unit.
- Plant uptake of contaminants from sediments or aquatic organism intake of contaminated groundwater.
- Resident and visiting wildlife ingestion of vegetation and aquatic organisms from the riparian zone and aquatic environments in and along the Columbia River.

AIR

- The transport of contaminants via the air pathway does not appear to be significant.

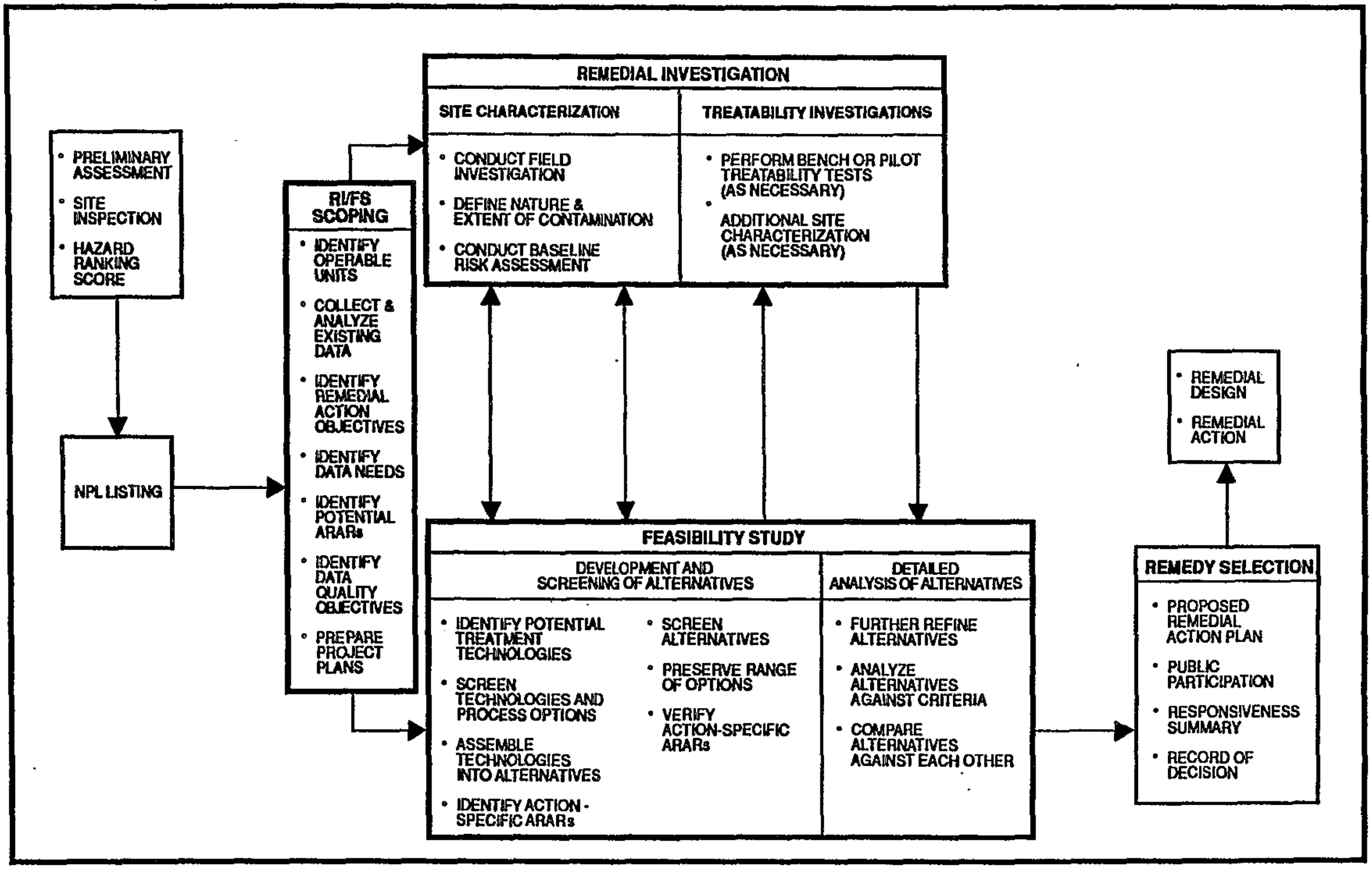


Figure 1-3. The Remedial Investigation/Feasibility Study Process (EPA 1988a).

REMEDIAL INVESTIGATION OBJECTIVES

- CONFIRM/REFINE CONCEPTUAL SITE MODEL
- SUPPORT BASELINE RISK ASSESSMENT
- SUPPORT ARARs ASSESSMENT
- SUPPORT DEVELOPMENT/EVALUATION OF REMEDIAL ALTERNATIVES

CONFIRMING AND REFINING THE CONCEPTUAL SITE MODEL

- Location, disposal history, and construction of all identified and newly discovered contaminant sources.

- Quantity, nature, and extent of contamination in the vadose zone, especially from disposal of radioactive and nonradioactive liquid wastes in the cribs and trenches.

- Quantity, nature, and extent of contamination in the lower vadose zone and capillary fringe (just above the water table) from the losses of contaminated cooling waters from the retention basins and pipelines, and the resulting mound of groundwater that developed during operation of the reactor.

- Geochemical, geologic, and physical characteristics of the vadose zone, especially in relation to the transport of liquid solutions containing the various kinds of hazardous chemicals and wastes disposed.

- Capillary fringe interactions between the lower vadose zone and the top of the water table; a determination of the relationship between water table fluctuations and release and transport of contaminants to groundwater.

- Quantity, nature, and extent of contaminants in the groundwater system.

- The nature and geometry of the hydrogeologic system must be identified. These data needs include the thickness, areal extent, and intrinsic properties (e.g., hydraulic conductivity) of the various hydrostratigraphic units.

- Vertical and horizontal gradients in selected hydrostratigraphic units must be determined.

- Information on the groundwater recharge and discharge must be assessed, and contaminant transport from offsite sources to the 100-F Area must be assembled.

- Information is needed to evaluate the impact of fluctuations in river stage on shallow groundwater flow.

- The nature and extent of contamination in the surface water and river sediments adjacent to and in the vicinity of the 100-F Area.

- The nature and extent of contamination in the terrestrial, riparian, and aquatic biota adjacent to and in the vicinity of the 100-F Area must be gathered.

BASELINE RISK ASSESSMENT

- Information on the nature of specific sources and the nature of wastes or contaminants within those sources.

- Nature and extent of contamination in the vadose zone from disposal of liquid wastes and from leakage of contaminated cooling waters. Areas of particular interest are the very shallow vadose zone, to about 30 ft (9 m) because of potential surface releases, and the deep vadose zone in terms of flux of contaminants to the groundwater.

- Information on the constituents, quantities, and disposal of hazardous substances used or generated at the operable unit and the extent of the resulting contamination.

- Nature and extent of contaminants in the groundwater system, focusing on the determination of vertical gradients and contaminant distribution in the water table and deeper Ringold Formation aquifers.

- Nature and extent of soils contaminated by seeps at the river edge.

- Nature and extent of contamination in the surface water and river sediments adjacent to and in the vicinity of the 100-F Area

- Nature and extent of contamination in the terrestrial, aquatic, and riparian biota adjacent to and in the vicinity of the 100-F Area.

- Nature of radiological and chemical contaminants associated with airborne particulates.

ARARs ASSESSMENT

- Better characterization of the soils around and under the waste disposal units for possible exceedances of ARARs.
- Better characterization of the extent of groundwater exceedances of the drinking water standards (e.g., MCLs, MCLGs) for the radioactive contaminants.
- Characterization of the groundwater for nonradioactive inorganic and organic contaminants, and for possible exceedances of drinking water and environmental standards for those contaminants.
- Characterization of surface water for exceedances of drinking water standards for radioactive contaminants.
- Characterization of surface water for nonradioactive inorganic and organic contaminants, and for possible exceedances of drinking water and environmental standards for these contaminants.
- Characterization of river and nearshore sediments for possible exceedances of ARARs.
- Determination of the presence of threatened or endangered plant and animal species, or the presence of critical habitats within the operable unit.
- Determination of the presence of any archaeological or historical resources that may be considered eligible for inclusion on the National Registry of Historic Places.
- Characterization of the air quality at the operable unit for possible exceedances of air particulate and contaminant ARARs.

DEVELOPING AND EVALUATING REMEDIAL ALTERNATIVES

- Better information on the location, design, construction, uses, and decommissioning of each of the waste disposal units.
- Better information on the nature of specific sources and the nature of wastes or contaminants within those sources, e.g., the amount and concentrations of sludge within effluent lines and the location and engineering specifications for the lines.
- Better information on the nature and extent of contamination in the shallow vadose zone; specifically, the volume and the physical (e.g. grain size distribution, moisture content, vertical and horizontal permeability, infiltration), chemical, and engineering properties of contaminated soil (i.e., soil that exceeds ARARs values) and the volume of any uncontaminated soils that overlies the contaminated soils.
- The nature and extent of contaminants in the groundwater system.
- Offsite sources of contaminated groundwater that migrate or could migrate into the 100-F Area.
- The hydrodynamic characteristics of the unconfined aquifer at the 100-F Area.
- Nature and extent of contaminated seeps and springs discharging into the Columbia River and the nature and extent of contaminated sediments along the riverbank and the backwater area just south of the 100-F Area.
- Treatability study information relevant to the technologies on which treatment-based remedial alternatives will be developed.

OPERABLE UNIT CHARACTERIZATION

- TASK 1--PROJECT MANAGEMENT

SOURCE CHARACTERIZATION

- TASK 2--SOURCE IDENTIFICATION
- TASK 3--SOURCE INVESTIGATION

SITE CHARACTERIZATION

- TASK 4--VADOSE ZONE INVESTIGATION
- TASK 5--GROUNDWATER INVESTIGATION
- TASK 6--SURFACE WATER AND SEDIMENT INVESTIGATION
- TASK 7--AIR INVESTIGATION
- TASK 8--ECOLOGICAL INVESTIGATION
- TASK 9--CULTURAL RESOURCE INVESTIGATION
- TASK 10--OTHER TASKS
- TASK 11--DATA EVALUATION
- TASK 12--BASELINE RISK ASSESSMENT
- TASK 13--RI REPORT - OPERABLE UNIT CHARACTERIZATION SUMMARY.

TABLE FSP-1. PROPOSED SOURCE CHARACTERIZATION SAMPLES AND ANALYTES (Sheet 2 of 7)										
				Analyses						
Subunit Number	Borehole Number	Sample Depth (Feet)	Sample Number	Volatile Organics	Semi-volatile Organics	Metals	Radio-nuclides	Conven-tionals	Figure Number	Subunit Previously Sampled?
116-F-4	BH11	5	BH1101			X	X		FSP-3	Yes
		7	BH1102			X	X	X		
		10	BH1103			X	X			
		15	BH1104	X	X	X	X	X		
	BH12	5	BH1201			X	X			
		7	BH1202			X	X	X		
		10	BH1203			X	X			
		15	BH1204	X	X	X	X	X		
	BH13	5	BH1301			X	X			
		7	BH1302			X	X	X		
		10	BH1303			X	X			
		15	BH1304	X	X	X	X	X		
	BH14	5	BH1401			X	X			
		7	BH1402			X	X	X		
		10	BH1403			X	X			
		15	BH1404	X	X	X	X	X		
116-F-5	BH15	7	BH1501			X	X		FSP-4	Yes
		10	BH1502	X	X	X	X	X		
116-F-6	BH16	8.5	BH1601	X	X	X	X	X	FSP-5	Yes
		11.0	BH1602			X	X			
	BH17	8.5	BH1701	X	X	X	X	X		
		11.0	BH1702			X	X			
116-F-7	BH18	10	BH1801	X	X	X	X	X	FSP-6	Yes
		20	BH1802	X	X	X	X			

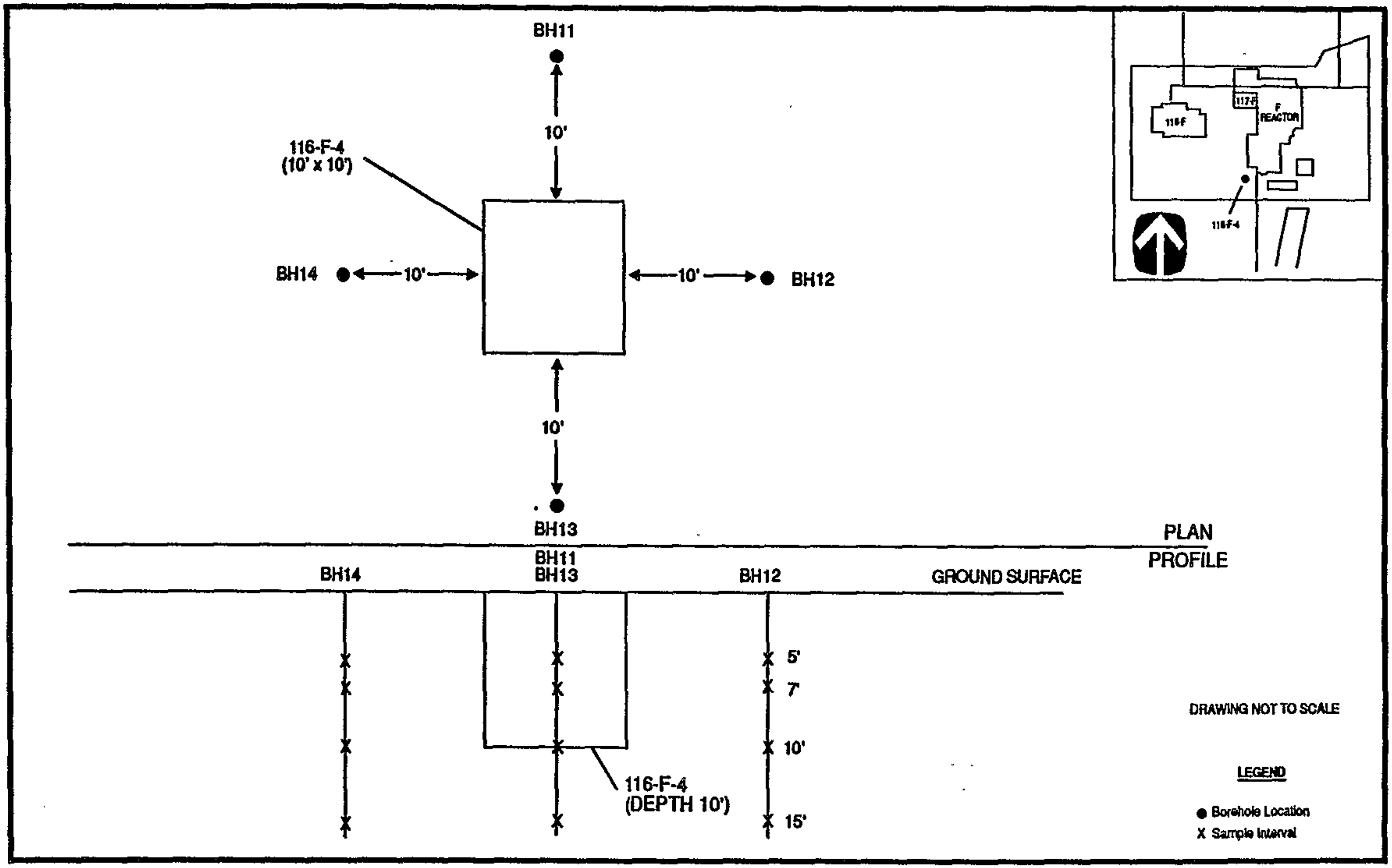


Figure FSP-3. Proposed sample locations for source characterization of subunit 116-F-4: 105-F Pluto Crib.

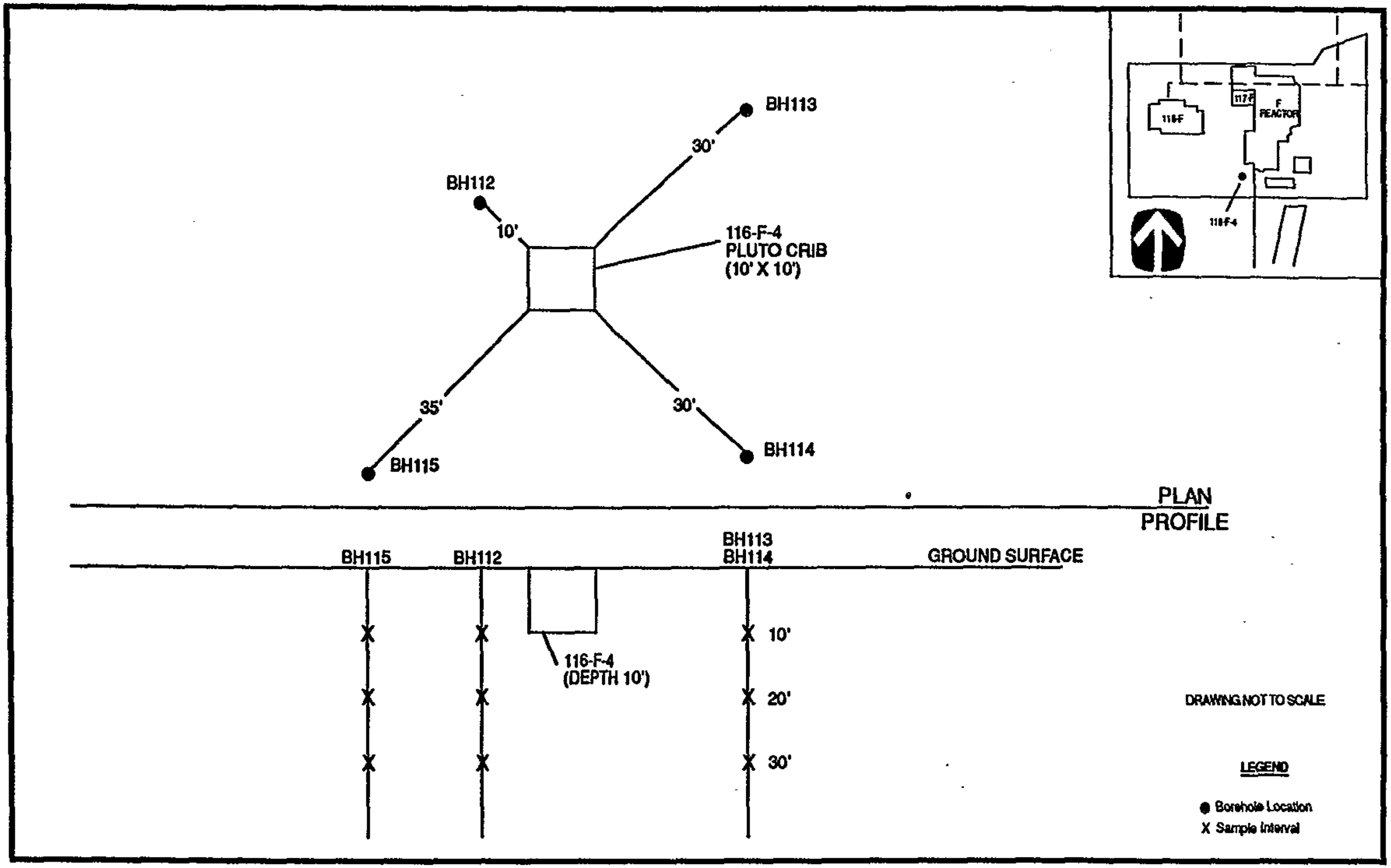
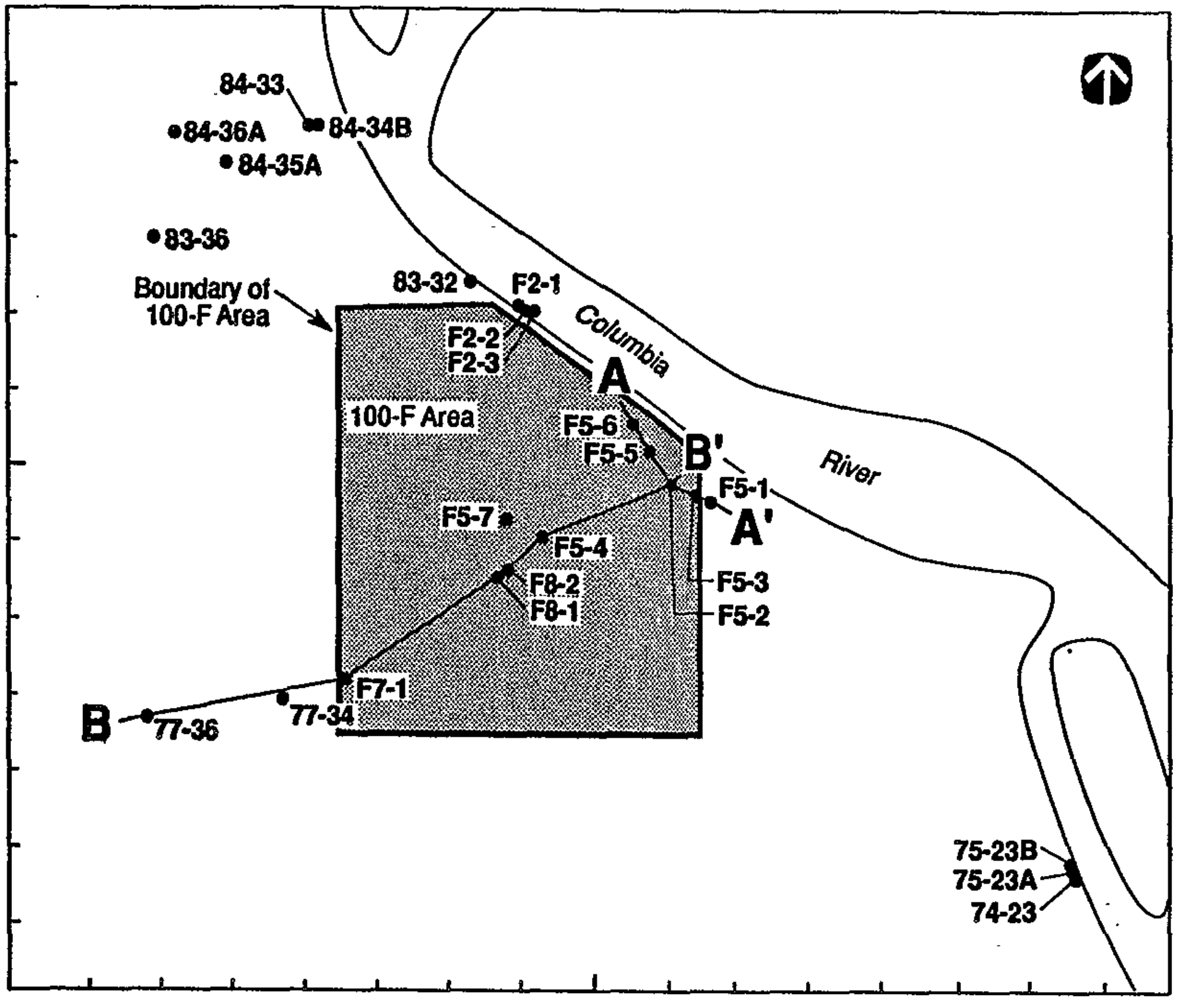


Figure FSP-20. Proposed sample locations for site characterization of subunit 116-F-4: 105-F Pluto Crib.

9 1 1 2 2 [illegible] 1 5 3 3



Note:
These data have been retrieved from the Westinghouse Hanford Groundwater Data Base using the Geo Science Group PARADOX data base system, and modified for purposes of this document.
Well log data unavailable for well no. 77-34.

Figure 2-7: Lithologic Cross-Section and Groundwater Well Location Identification Map.

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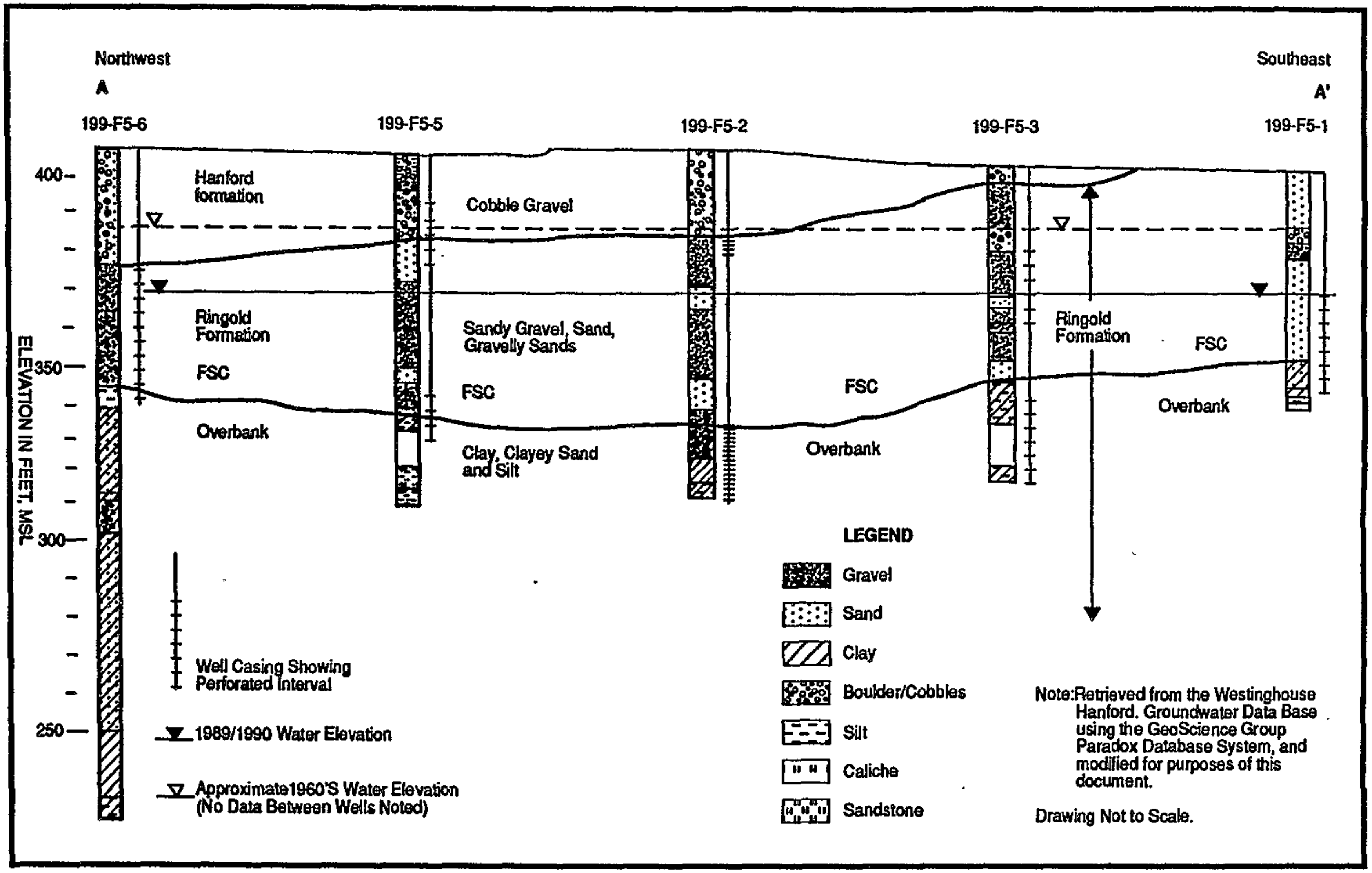
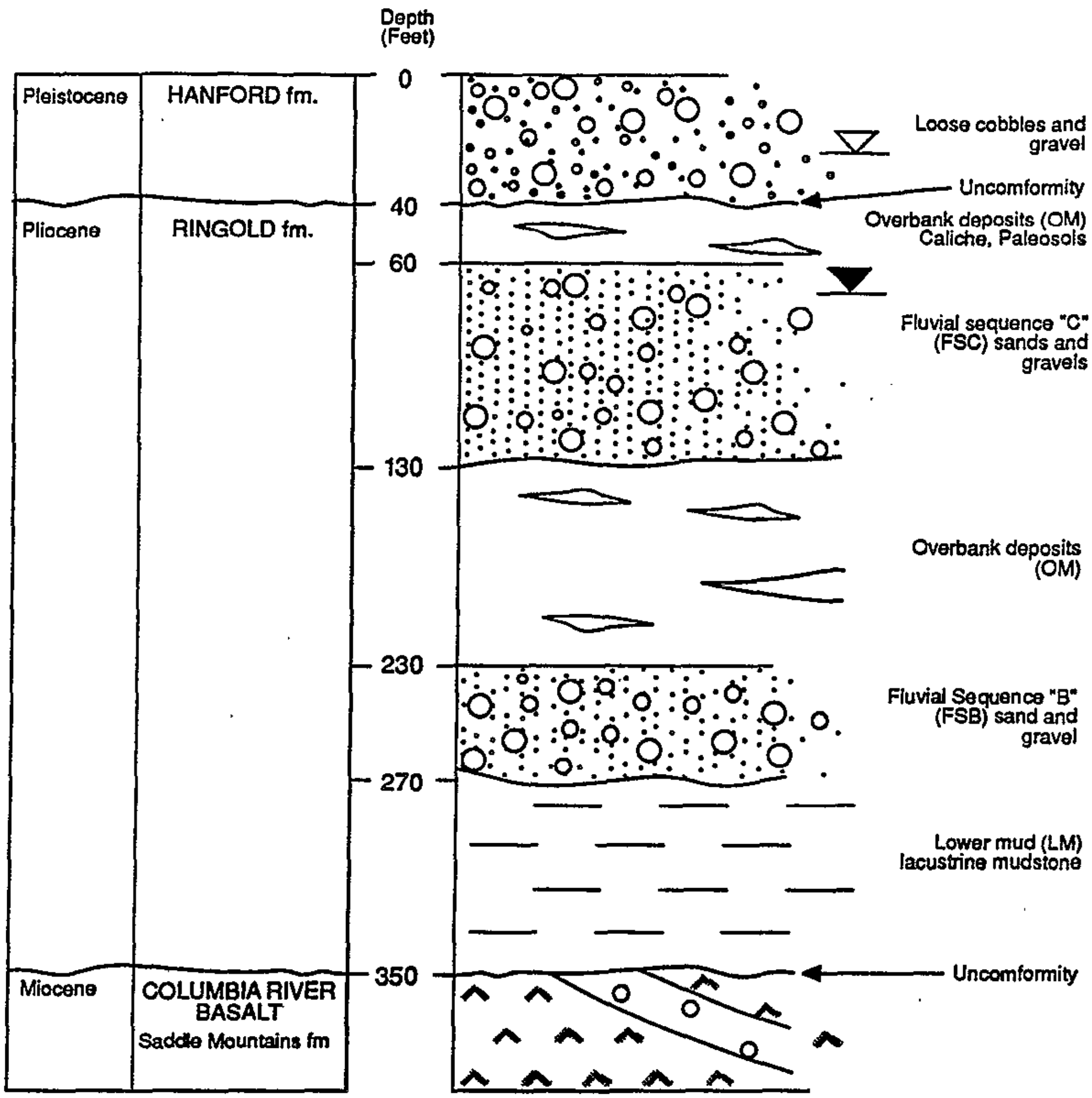
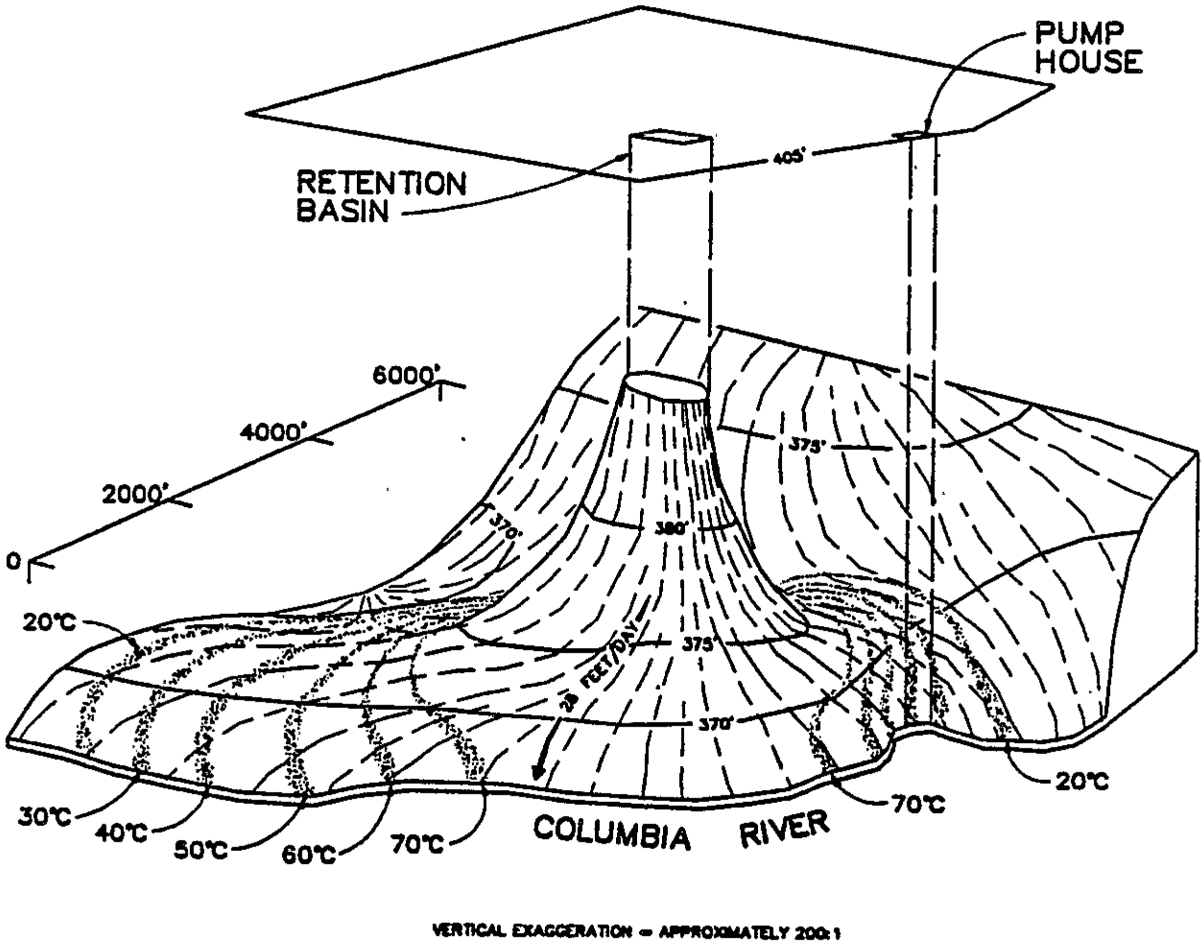


Figure 2-19. Cross-Section A-A' in the 100-F Area. (See Figure 2-7 for location)



Adapted from Lindsey, 1991, personal communication.

Figure 2-21. Generalized Stratigraphic Column For The 100-F Area.



Source: Brown 1963.

30419F17

Figure 3-18: Perspective Drawing of the Water Table Underlying the 100-F Area During Operations.

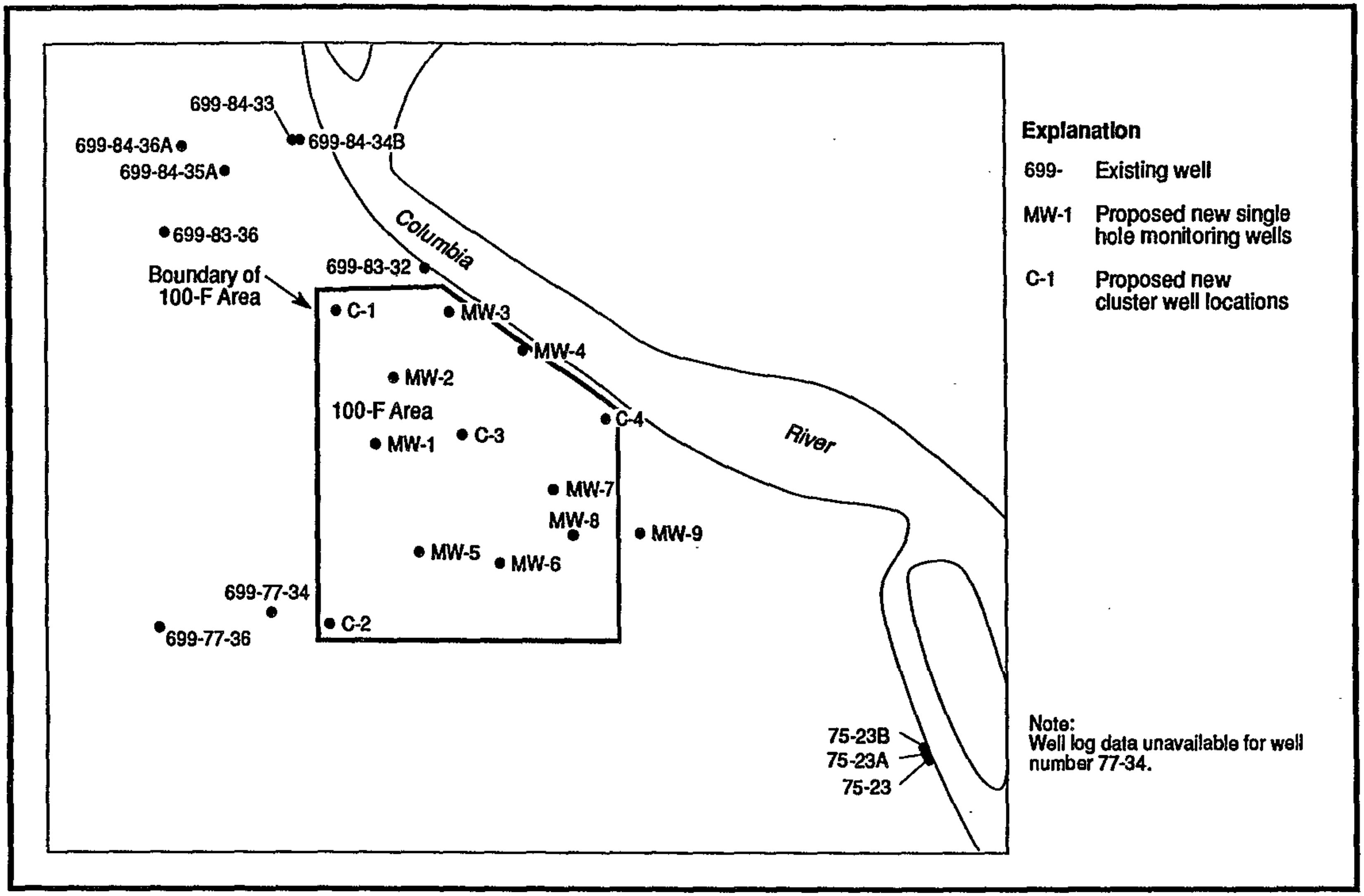


Figure FSP-37. Proposed Location of New Monitoring Wells to be Installed in the 100-F Area.

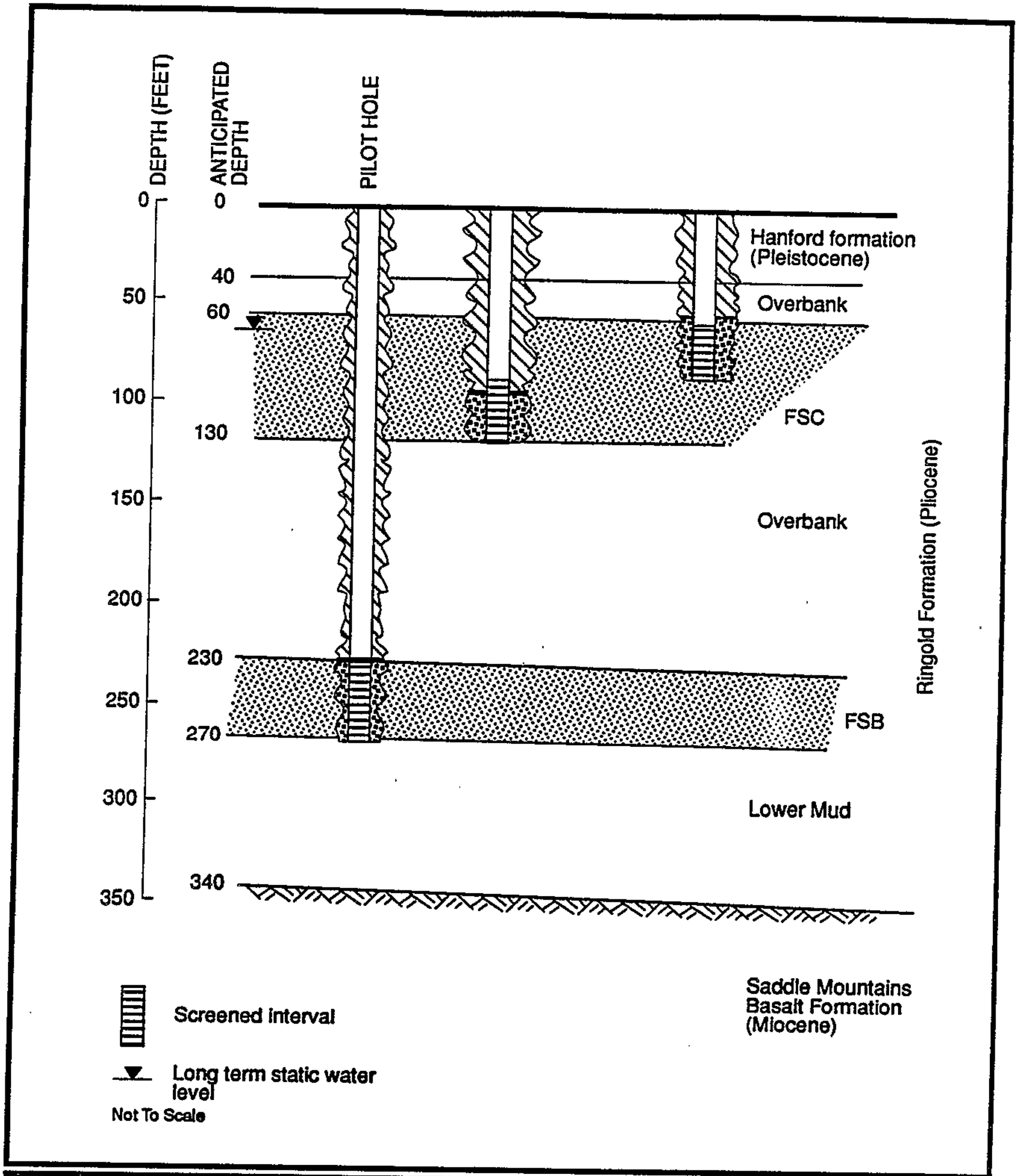


Figure FSP-39. Multiple Well Completion Northwest Corner, 100-F Area

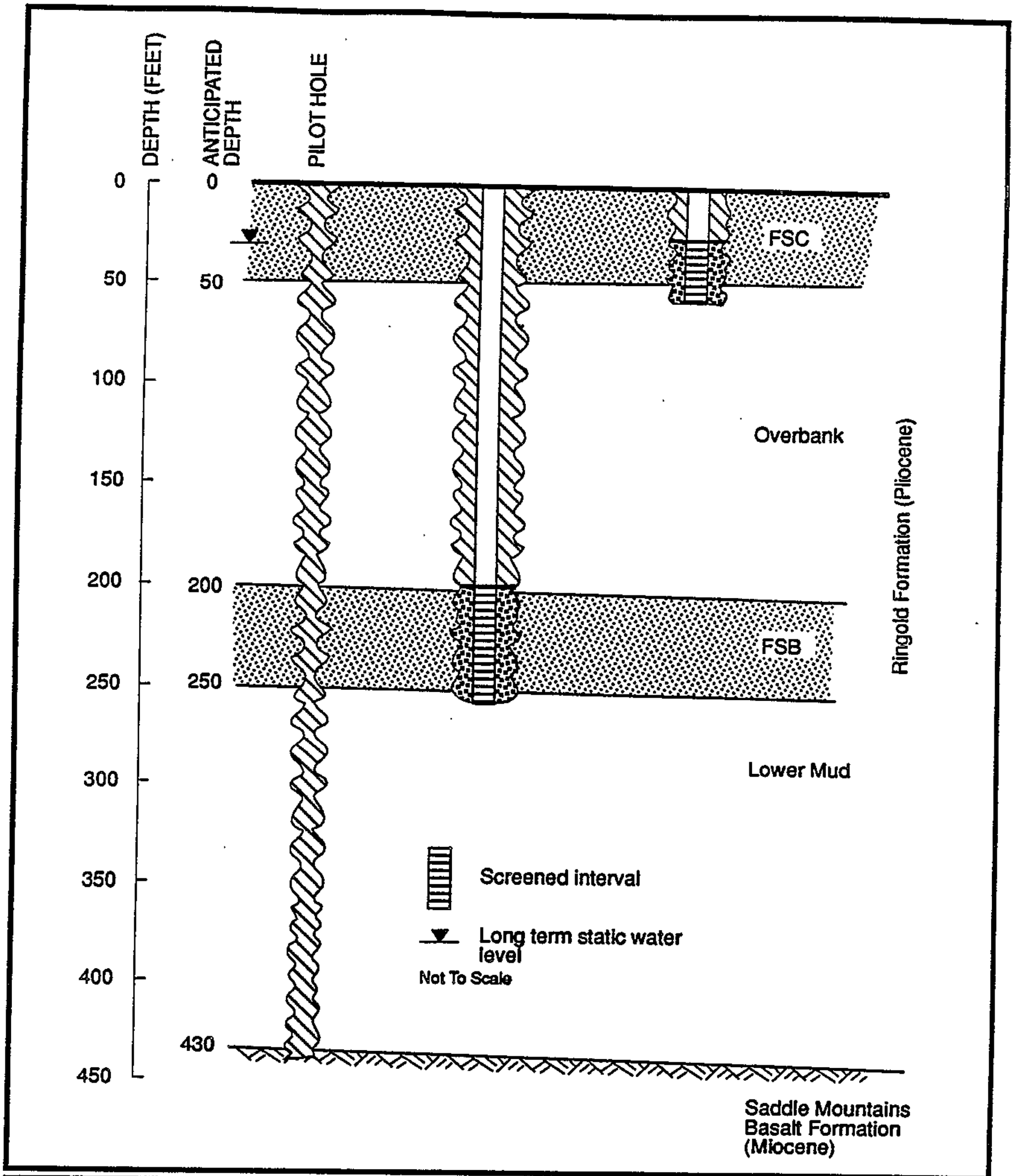


Figure FSP-40. Multiple Well Completion Southwest Corner, 100-F Area

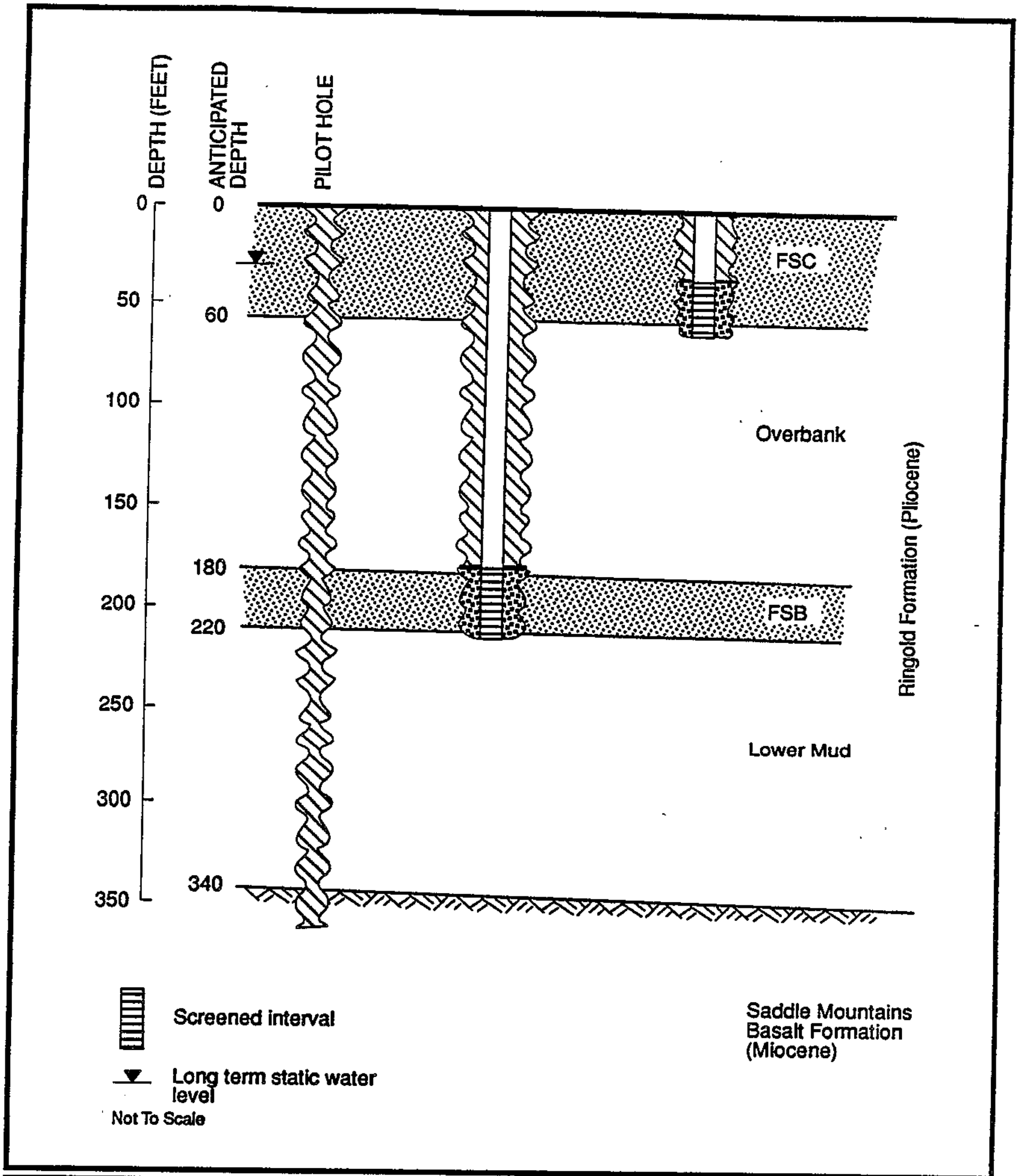


Figure FSP-41. Multiple Well Completion Southeast Corner, 100-F Area

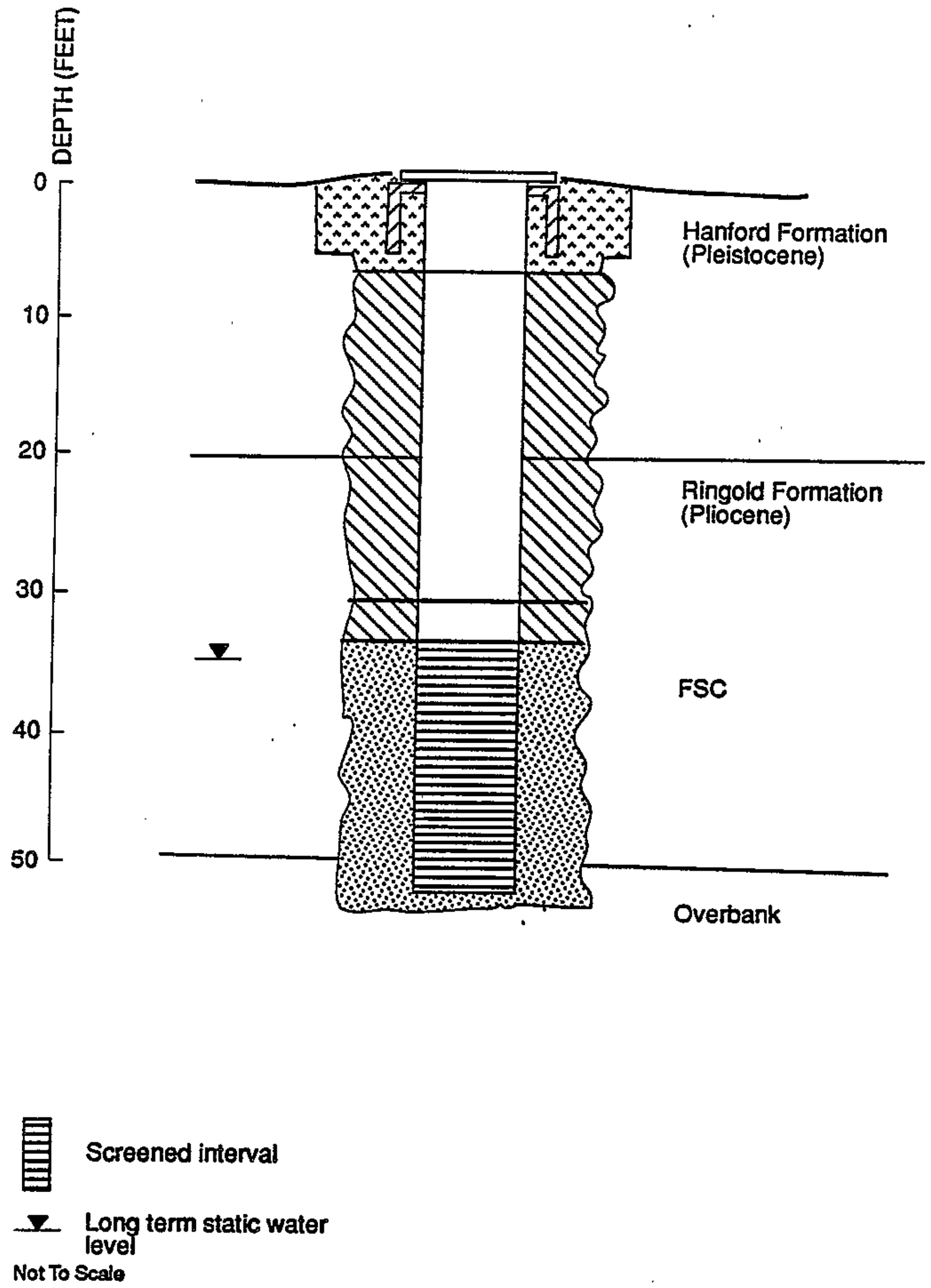


Figure FSP-42. Single Well Completion, 100 F-Reactor Area.

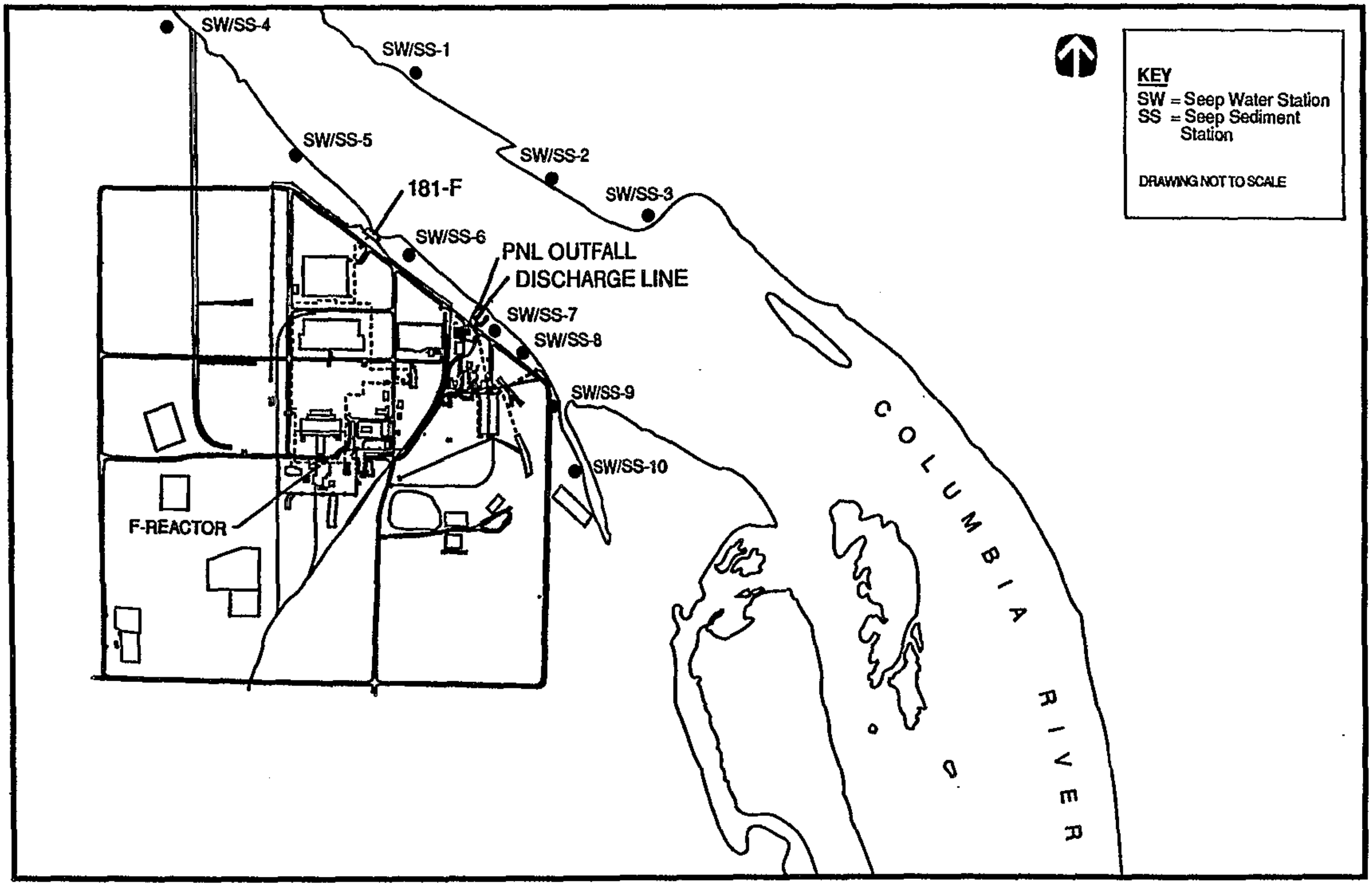


Figure FSP-43. Proposed seep water and sediment sampling stations along the shoreline of the 100-FR-1 Operable Unit.

9 1 1 2 1 1 9 3

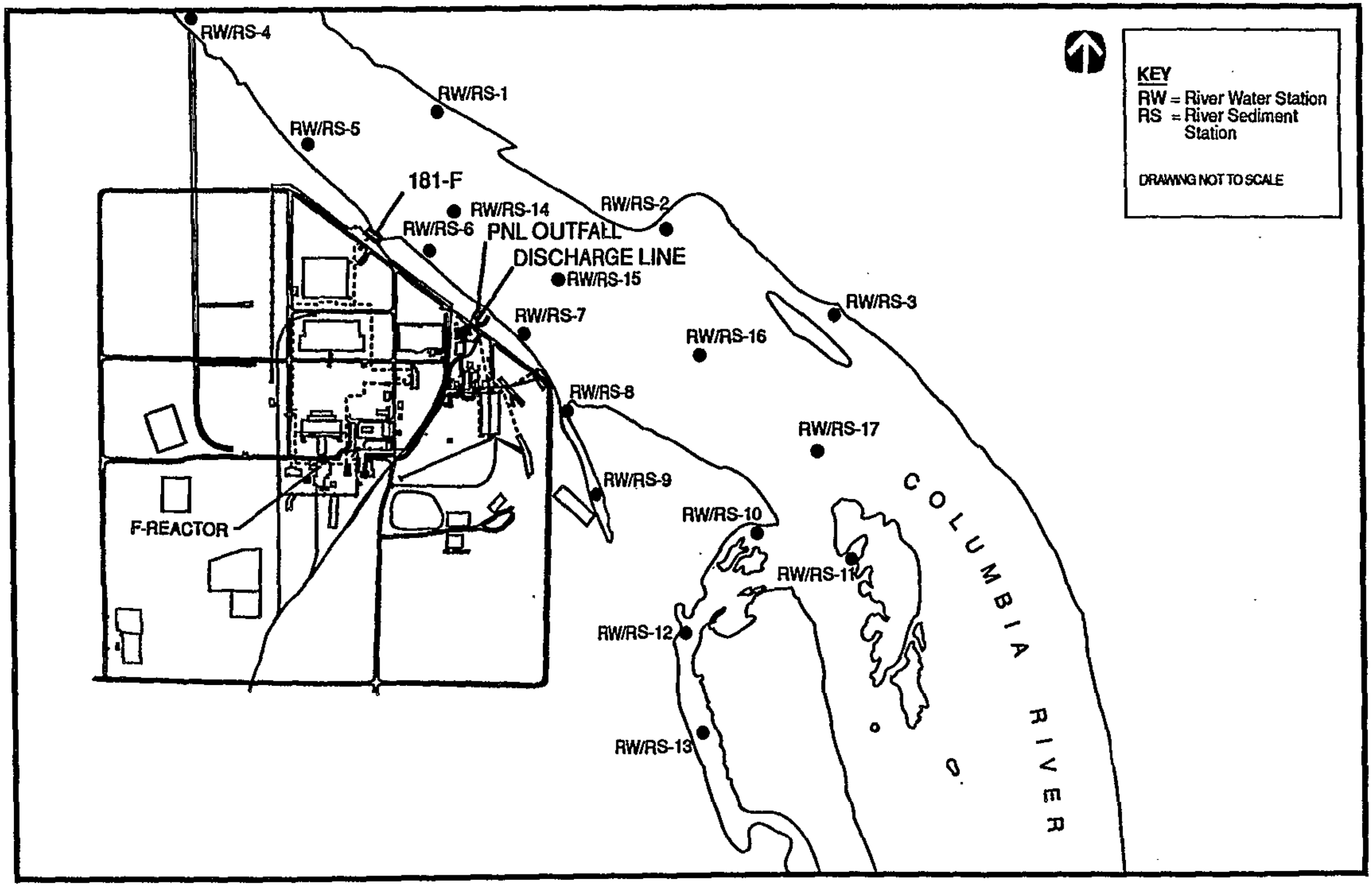


Figure FSP-44. Proposed river water and sediment sampling stations in the Columbia River for the 100-FR-1 Operable Unit.

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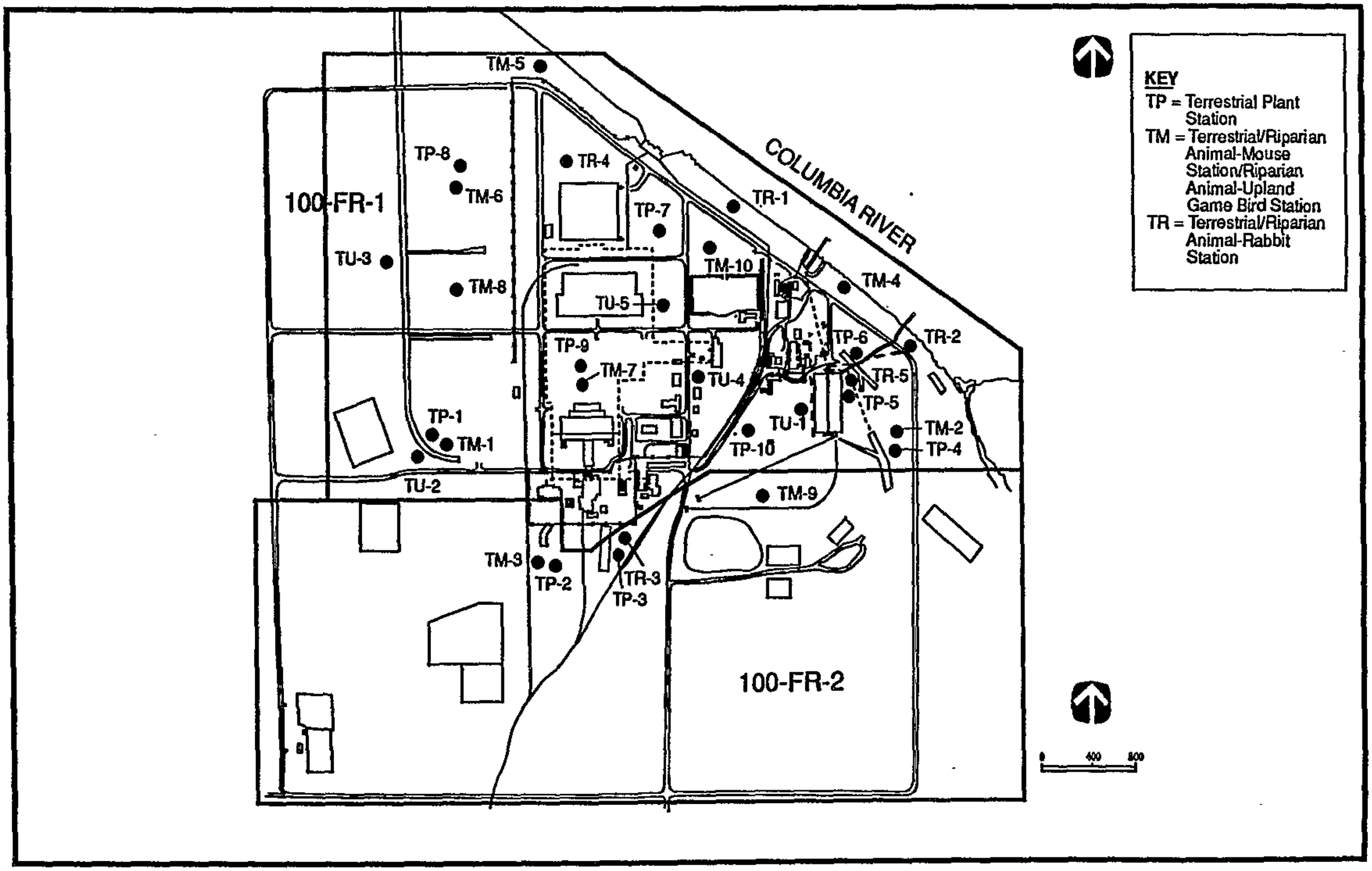

Figure FSP-45. Proposed terrestrial plant and terrestrial/riparian animal sampling stations for the 100-FR-1 Operable Unit.

Corps Draft A
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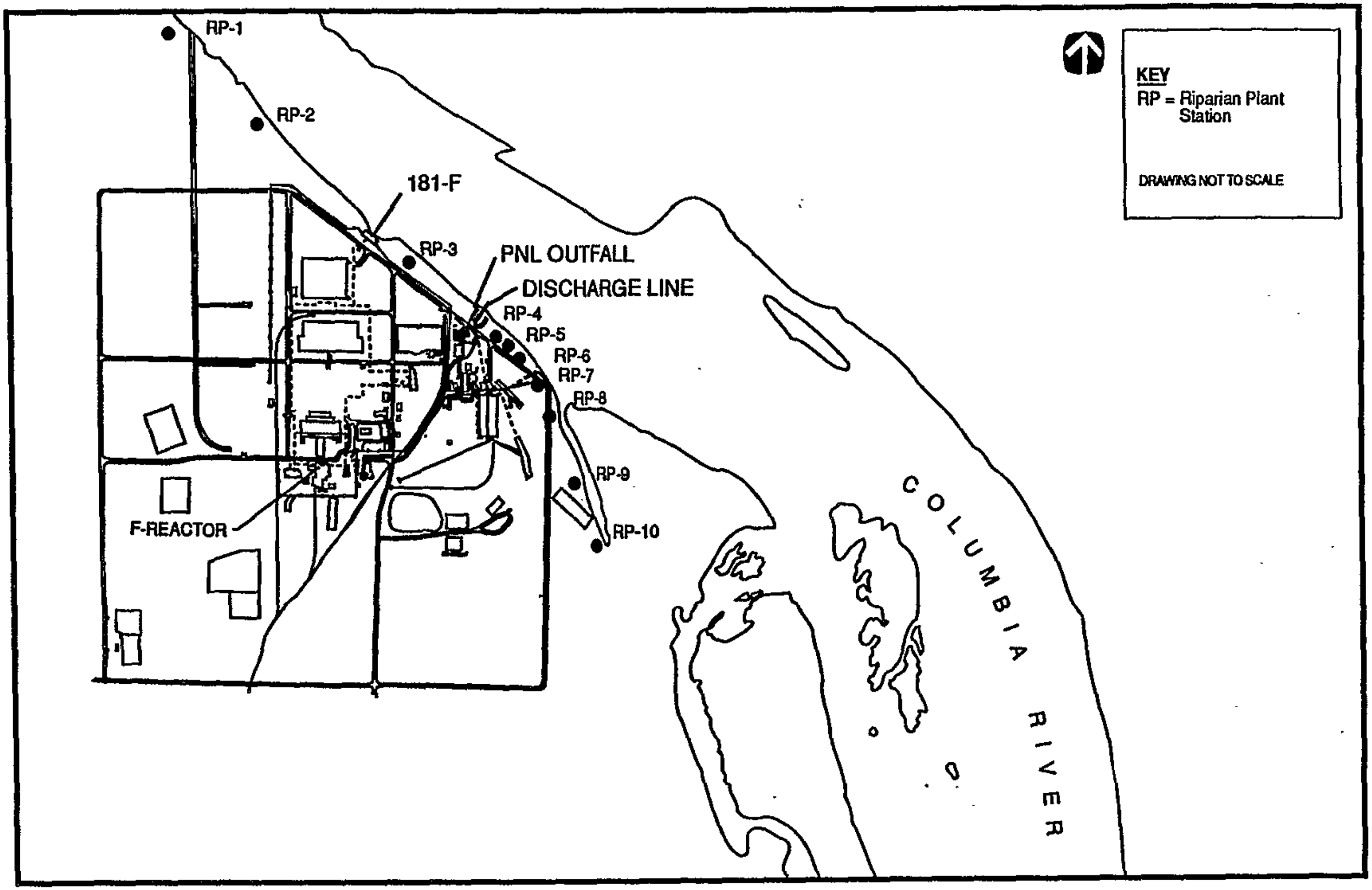

Figure FSP-46. Proposed riparian plant sampling stations for the 100-FR-1 Operable Unit.

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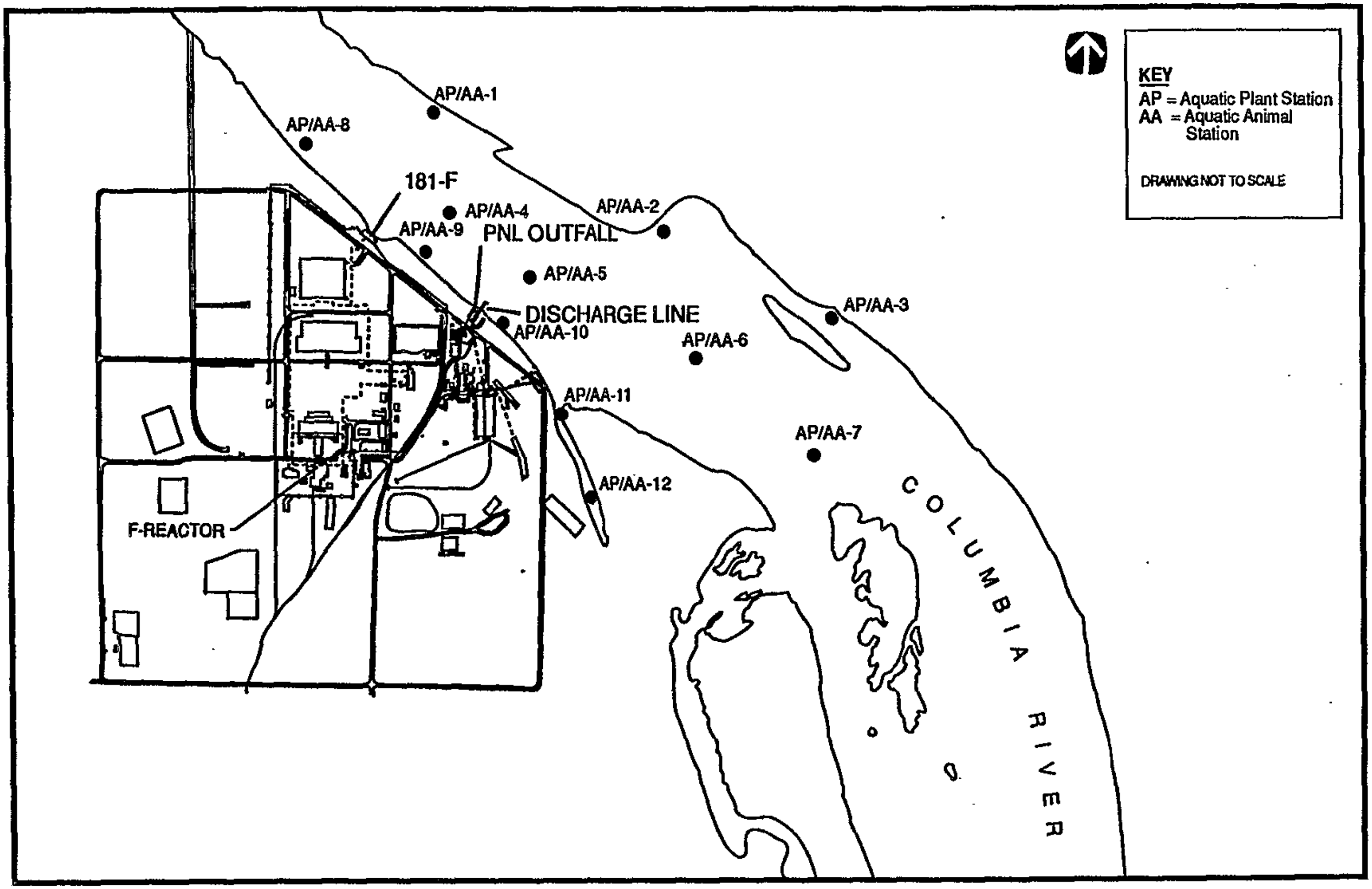

Figure FSP-47. Proposed aquatic plant and animal sampling stations for the 100-FR-1 Operable Unit.

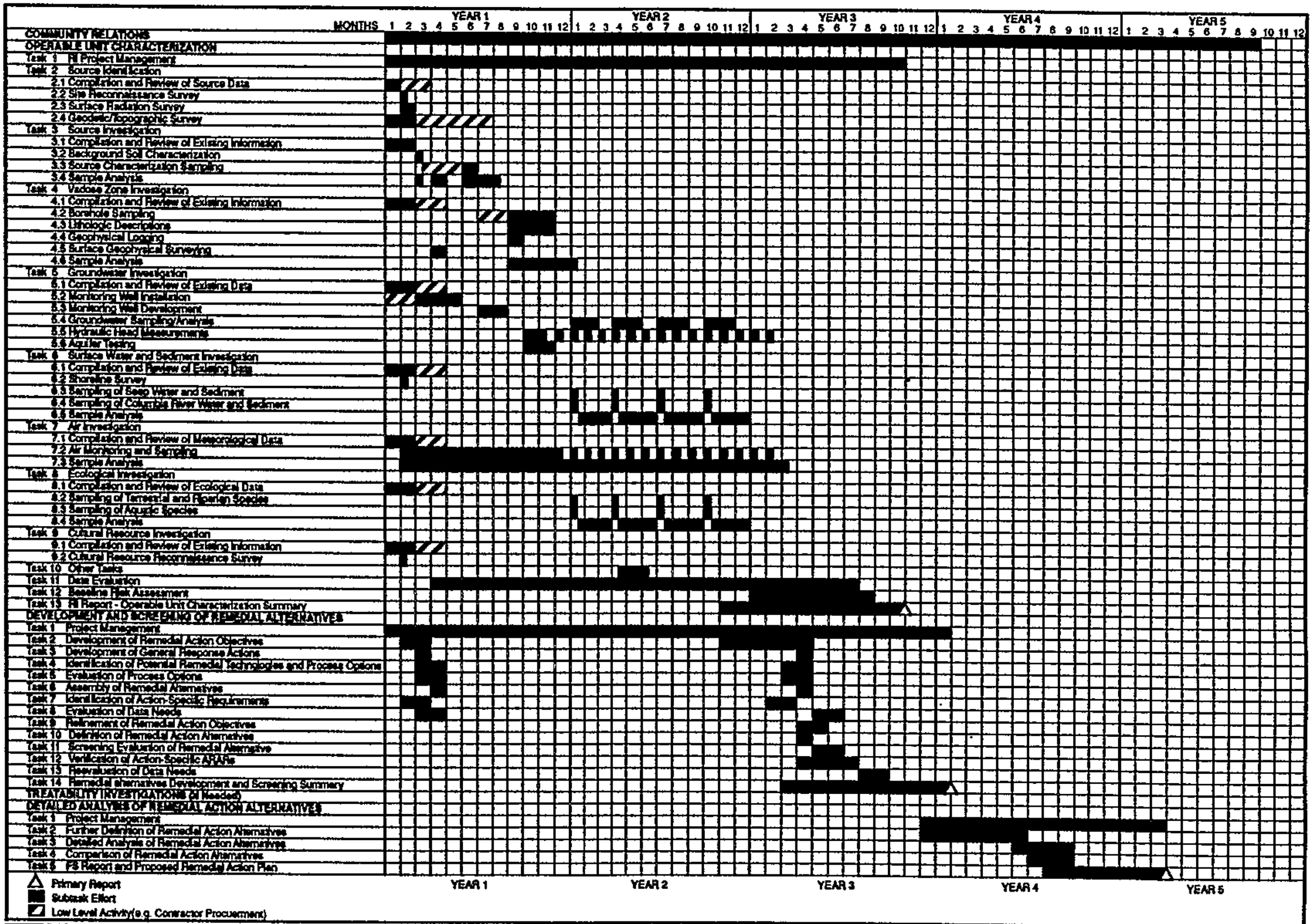

Figure 6-1. Preliminary Schedule for the 100-FR-1 Operable Unit RI/FS.

Distribution

100-FR-1 Unit Managers Meeting
April 16, 1991

Dave Einan, EPA (B5-01)
Pamela Innis, EPA (B5-01)
Doug Sherwood, EPA (B5-01)
Dan Duncan, EPA, Region 10, RCRA
Chuck Cline, WDOE (two copies)
R.O. Patt, Oregon Water Resources Dept.
Ward Staubitz, USGS
Donna Lacombe, PRC
Doug Fassett, SWEC (A4-35)
Jim Goodenough, DOE-RL (A6-95)
Mary Harmon, DOE-HQ (EM-442)
Bob Stewart, DOE-RL (A6-95)
John Stewart, USACE
Jim Patterson, WHC (B2-15)
Tim Veneziano, WHC (B2-35)

ADMINISTRATIVE RECORDS: 100-FR-1, Care of Susan Wray, WHC (H4-22)

Please inform Doug Fassett (SWEC) of deletions or additions to the distribution list.